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ROYAL AIRCRAFT ESTABLISHMENT

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December 1981

**SWEDISH DEFENCE RESEARCH
ABSTRACTS 80/81-4**

by

National Defence Research Institute, Stockholm

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SWEDISH DEFENCE RESEARCH ABSTRACTS 80/81-4

[FRÖ FÖRSVARS FORSKNINGS REFERAT 80/81-4]

by

National Defence Research Institute, Stockholm

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EDITOR'S SUMMARY

The Swedish National Defence Research Institute issues a quarterly list of unclassified Reports published by the Institute. The titles of these Reports and informative abstracts have been translated in English. This volume is the Fourth issue of 1980/81. Further volumes will be translated in due course. The main topics covered are: protection - atomic, biological, chemical; ammunition and weapons; conduct of war, information and commands; vehicles and spacecraft; reliability and logistics; human factors; associated studies and their solutions; positive methods for limitation and control of armaments; psychology reports.

EDITOR'S NOTE

The Reports are in Swedish unless some other language is indicated (usually English). When requesting Reports it should be appreciated that an English version will not normally be available, and that the prices of the original Swedish documents have not been indicated in this Translation. Reports may be obtained from:

FOA Centralkansliet, 104 50 Stockholm, Sweden

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A PROTECTION - ATOMICA1 The nuclear weapon threat

- (185) FOA Report B 20030-A1
 Comparison between PIXE and special XRF techniques applied to the analysis of individual particles (in English)
 Lars H. Andersson

Individual particles with diameters of the order of 5 μm were analysed by the PIXE technique, with an electron micro-sensor and by a special X-ray fluorescence technique. The sample, in the form of a small crystal of calcium fluoride, was mounted on a carbon foil and excited with protons, electrons or, in the X-ray fluorescence case, by X-rays generated in a selected primary material by the electron beam from the electron micro-probe. In the last case a piece of material (a screen) prevented the primary X-rays from reaching the detector. The limits of detection of the three different methods for uranium in particles of calcium fluoride were compared.

Offprint from Nuclear Instruments and Methods (1981), 181, 109-114.
 North Holland Publishing Company; FOA Reprints 1980/81:37

A3 Effects of nuclear explosions, and protective measures

- (186) FOA Report C 40133-A3
 The vulnerability of the dairy industry. A survey of the problem
 Marianne Gillberg-Wickman April 1981

The purpose of this report is to illustrate the vulnerability of the dairy industry. If for some reason, *eg* war, a blockade, or a nuclear accident, Sweden were to have to rely on the domestic production of all the components for dairy processing, the country would not be able to cope without some well thought-out emergency planning.

This study was carried out at the instance of the National Institute of Radiation Protection. Project number: SSI/P129-79

B PROTECTION - BIOLOGICALB3 Injuries and treatment - biological

- (187) FOA Report B 40126-B3
 Enzyme-linked immunosorbent assay for immunological diagnosis of human tularemia (in English)
 Hans Erik Carlsson and others (March 1981)

Tularemia or squirrel pest is an infectious disease which periodically occurs in northern Sweden and for which the reservoir of infection chiefly consists of wild rodents. The disease is usually transmitted through the bites of infected flies. The virus *Francisella tularensis* can also be spread by the handling of dead animals, *eg* while hunting hares or by the inspiration of infected vapour. *Francisella tularensis* has also among other things been indicated as a potential airborne biological weapon.

The infectious dose of tularemia is very low, while however the bacteria are very hard to culture. The conventional laboratory diagnosis of tularemia therefore is largely based on immunological techniques for identifying antibodies in the infectious material and/or identifying infectious material in samples taken from patients.

In this research the enzyme-linked immunosorbent assay, ELISA, was adapted for the identification of antibodies against *Francisella tularensis* which occurred after the

disease. ELISA proves to be very suitable for the immunological diagnosis of tularemia. The method is more than ten times as sensitive as the traditional method of bacterial agglutination and it can easily be automated so as to form part of, eg screening systems for serological diagnosis. A clinical diagnosis can often be verified serologically by ELISA after as much as a week of sickness. By selectively identifying antibodies of the IgG and IgM classes respectively the incidence of the infection can be roughly dated, which is of importance in the diagnosis of patients from endemic areas or of people vaccinated against tularemia.

C PROTECTION - CHEMICAL

C2 Protective measures

- (188) FOA Report C 40134-C2
Overhaul of the Type 33 respirator
Roger Sundqvist

April 1981

The Type 33 respirator has been manufactured for about 10 years. An examination has been conducted mainly as to its functioning. In one respect it fails to meet the requirement for a civilian industrial respirator: the carbon dioxide content is too high. Its resistance to expiration should also be reduced. These factors have a serious effect on comfort, and should be possible to be improved by simple means. Positioning of the straps could also be greatly improved at little cost.

The sealing edge against the face is not flexible enough to afford a satisfactory seal with various facial shapes, wrinkles or beards. It should be possible to improve it by a different design, including redesign of the tools of manufacture. Some fairly simple modifications of the present tools may perhaps improve the respirator.

D AMMUNITION AND WEAPON TECHNOLOGY

D1 Technology of explosives

- (189) FOA Report C 20405-D1
Ageing tests of composite propellant and bonding agents based on HTPB
Bengt Nilsson and Roland Sandén

April 1981

Samples of composite propellant with the bonding agent constituent based on HTPB of the Type R-45HT were stored in closed cans at temperatures of +20°C, +40°C, +60°C and +80°C for 2-3 years. Two types of anti-oxidisation agent were tested, PBN and BKF. One of the propellants contains 1% of iron oxide powder. After various lengths of time the samples of propellant were removed for tensile tests and measurements of hardness. The propellants exhibit very good ageing properties.

Several materials for bonding layers based on HTPB were also examined. The materials were stored for long periods at room temperature and at +70°C, and were then tested for tensile strength and for adhesion to sheet steel. The results also indicate good ageing properties for these materials.

- (190) FOA Report C 20408-D1
The effect of rubble on the explosive process of a hydrogen-air mixture in an enclosed space
Henrik Almström and Staffan Berglund

May 1981

At the instance of the Government Nuclear Power Inspectorate an investigation was conducted to discover the damping effect of rubble on the process of detonation and deflagration in an enclosed space.

The investigation formed part of the Filtra project.

The purpose of the experiment was to record a pressure-time curve at six points on a vertical shock tube 240 cm long and of 25 cm diameter.

The experiment was performed with five different types of rubble, and a stoichiometric mixture of hydrogen and air was used in most of the experiments. For one type of rubble experiments were conducted with varying proportions of hydrogen.

In order to discover the ability of rubble to transmit an impulse to the walls a small-scale experiment was performed, in which the total impulse was measured when transmitted to the base surface of a small (70cm long) tube.

(191) FOA Report C 20411-D1
Test No.2 of propellants for rocket motor E573 (in English)
Anders Schwartz May 1981

For this investigation the propellants had reached the age of 85 months. A comparison was made with values of their properties obtained in the first investigations on propellants aged 32 months. Chemical stability is good. Measurements of tensile strength exhibited smaller variations at low temperatures and rapid loading. In these ranges the propellants may have become somewhat stiffer. The adhesion of the insulation was considerably reduced, especially that of propellant D23, in which the reduction measured was about 43%. Adhesion to propellant D28 was reduced by about 17%. Their hardness and rate of combustion was unchanged. It is recommended to make fresh measurements after about 5 years.

(192) FOA Report C 20413-D1
The blasting of masonry quays
Hugo Berg June 1981

A new method is proposed for the blasting of solid masonry quays, based on the principles of explosive excavation. This method enables the consumption of explosive and the preparation time immediately before the explosion to be greatly reduced, particularly when using civilian slurry-type explosives. The theoretical calculations quoted in the report should however be supplemented by practical model tests.

D4 Technical aspects of warheads

(193) FOA Report C 20404-D4
Fragmentation data for the 120mm M/42B practice shell
Anders Andersson and Fritiof Lithén April 1981

Object: to determine experimentally the mass distribution, and the velocities and angles of ejection of fragments from the warhead concerned, and taking this as a basis to calculate the range of the fragments.

Method: the shells were detonated in a detonation drum, a detonation bay and in an X-ray flash-tube apparatus.

Result: the fragments attain an ejection rate of about 150 m/s. They are ejected between -20° and $+40^{\circ}$, the majority between $0-40^{\circ}$. The range of the fragments will be about 300 m.

- (194) FOA Report C 20406-D4
Shaped charges against steel armour
Jan Ekberg

April 1981

Object: to gain some idea of the protective capability and the shape of the stand-off curve for a small-calibre shaped charge against KATF 415-8 armour.

Method: eighteen 45mm shaped charges containing 93% of pressed octogen were detonated against 10mm thick target plates erected to form a target stack. Detonation distances: 2, 6, 8, 10, 13.5 and 20 times the calibre of the explosive with three detonations at each distance. The plates were measured for Brinell hardness. Penetrations and hole diameters were measures.

Results: the report contains:

- (a) the fundamental curve in target material of commercial sheet iron,
- (b) the fundamental curve in target material of KATF 415-8 armour,
- (c) hole diameters in the above materials,
- (d) protective capability with respect to commercial sheet iron at different detonation distances.

- (195) FOA Report C 20409-D4
Some miscellaneous views on American and Swedish methods concerning "effects on aerial targets", Part I, physical principles
Ingrid Gyllenspetz

May 1981

This report compares the physical bases used in Swedish and American models for testing effects on aerial targets. The comparison covers impact tubes, the fragmentation of warheads, fragment penetration, discharge effects and pressure effects.

Fairly close agreement is obtained in these fields, and no drastic modifications are proposed for the Swedish model.

- (196) FOA Report C 20410-D4
Effects on aerial targets. Basis for calculating the penetration power of fragments
Ingrid Gyllenspetz

May 1981

The object of this study was to attempt to find formulae for perforation by fragments for use in the programme for calculating effects, and in deriving the principles for these. It is particularly important to find formulae which can be used as an initial theory when experimental data are lacking.

Equations are presented for the penetration depth of fragments and the limiting values of penetration. The latter affords good agreement with equations previously applied to aluminium, steel and heavy metals, and it should therefore hold true for higher impact velocities, and afford possibilities for extrapolation to 'unknown' materials.

The Report also discusses the penetration by fragments into layered plates at high velocities, and the effect of the angle of impact on penetrating power.

- (197) FOA Report C 20415-D4
Sintered tungsten composites. Investigation of grain deformation and recovery in the tungsten phase
Nils Artlov (KTH) and Gunnar Verngren (KTH)

June 1981

Tungsten alloys sintered in the molten phase in the proportions 90W, 7Ni and 3Fe constitute a particulate composite having tungsten particles in a softer matrix. This composite has been the subject of studies of mechanical properties at the level of micro-structure at the Materials Research Branch of the FOA. The present article reports an investigation of the grain structure which develops in plastic deformation with recrystallisation in subsequent thermal treatment.

The material in question exhibited a distinct $[110]$ grain deformation with slip-plane systems $(10\bar{1})[111]$ and $(01\bar{1})[111]$. Partial recrystallisation of the strongly deformed material was obtained at 1100°C . The material also had a pronounced micro-hardness peak at 800°C .

The results acquired are of importance in assessing the possibilities for improving the mechanical properties of the material by processing it, followed by thermal treatment.

D8 System studies

- (198) FOA Report C 20407-D8(E3)
 Meteorological observations and measurements connected with vision tests in
 darkness Autumn 1980
 Arne Hågård and others April 1981

This report contains the results of meteorological measurements and observations carried out in association with series of experiments on vision in the dark during Autumn 1980 at Skövde and Boden.

The meteorological measurements and observations performed during the experiments at half-hourly intervals are listed in the tables. Results are also reported of measurements made by Section 813 with the IR transmissometer which was sited within the actual test area.

- (199) FOA Report C 20412-D8
 VERANA - a computer program for computing weapon effects in complex systems
 Ingemar Andersson May 1981

The effect of a warhead on a target is often computed in two stages. The probabilities of the various vulnerable parts of the target's being knocked out by the warhead are computed first. Using these probabilities and knowing how the different parts of the target affect different functions in the target, the probabilities are then computed of these functions' having been knocked out.

In this report a computer program VERANA is described, by means of which these latter probabilities can be computed for complex targets. It forms part of the VERKSAM programming system. The report also describes the programs HTEST and HPROP, which test and store the functional descriptions. Hitherto VERANA has been used for computing the effects on surface vessels, although the program is not tied to any one given type of target. Among other things the results have been used for comparing the effects of different warheads and for assessing the protection and survival of various targets in a battle environment.

- (200) FOA Report C 20416-D8
 Model for computing probabilities for the detection, target-tracking and strike
 for final-phase guided ammunition
 Börje Aulin June 1981

The report describes a Monte Carlo model which computes the probabilities for detection, target-tracking and strike for final-phase guided ammunition against a multiple target array of land or seaborne targets. The principal inputs are the target grouping and target areas, cloud conditions, the weight and aiming of the salvo, projectiles' unguided trajectory, errors in target position and ballistic scatter, field-of-view and range of the detector, target-tracking properties, control capabilities and precision of guidance.

The model was programmed for alphanumerical/graphic interactive operation on a DEC-10. Output data include the probabilities that (one or more) targets are in the field of vision and/or guidance, and the number of single or multiple hits per salvo.

E CONDUCT OF WAR - INFORMATION AND COMMAND TECHNIQUE

E1 Reconnaissance, target location and fire control

- (201) FOA Report B 30044-E1
Shrinking of RC-coded binary patterns (in English)
Roger Cederberg

The shrinking and expansion of binary objects are normal operations in image-processing. Some examples of application include: the detection of small groups of objects, the filling-in of holes and in particular shrinking to what is termed a skeleton with the preservation of connectivity. A number of algorithms for shrinking are presented. These are based throughout on parallel or sequential analysis of the surroundings for each pixel in the image. The input used by this algorithm is a coded image, known as a RC-code (a variant of a chain code). A result is that computation will be considerably more efficient than previous algorithms.

Offprint from 5th International Conference on Pattern Recognition, December 1980.
FOA Reprints 1980/81:31

- (202) FOA Report C 30219-E1 (in English)
Laser depth sounding in the Baltic Sea May 1981
Håkan Kleverbrant and others

A helicopter-borne laser system for depth sounding was demonstrated in the Baltic for a week. More than 175000 laser pulses were stored on magnetic tape, representing about 5 hours of effective data collection. The experiments were carried out over four different test areas with varying conditions of visibility in the water. Simultaneous measurement of 'seatruth' data on the optical properties of the water was made from boats. A maximum penetration down to more than 30 m was achieved, in close agreement with theoretical estimates. Sea measurements of an area about Fifång exhibited good agreement between the laser data and profiles obtained from the Navigation Laboratories' sonar down to 20 m depth. The experiment demonstrated the development potential of laser bathymetry for depth sounding and measurement of turbidity in Swedish coastal waters. A laser scanning system would in many cases substantially reduce costs and increase the rate of data collection in the conduct of surveys for marine charts.

- (203) FOA Report C 30220-E1 (in English)
Studies of target signatures with a coherent laser radar May 1981
G. Bolander and others

The report describes measurements of target signatures performed with a laboratory model of a CO₂ laser radar based on homodyne Doppler detection. The sensitivity of the receiver and its dependence on the output aperture have been studied in earlier experiments. Some tests were also made concerning display and distance measurement. Target signature measurements cover amplitude spectra, noise, and rms signals. The detection probabilities were calculated for various false-alarm risks, based on these quantities. Different types of target were investigated. Sand-blasted aluminium sheet represented diffusely reflecting targets, and corner reflectors specular targets. Military vehicles were used as targets of interest, also apparent flight obstacles, such as wires and masts. Comparisons were drawn between experiment and theory.

E2 Communications

- (204) FOA Report A 30024-E2
 Comparative antenna measurements in real environment: Hallén, longwire and disc
 cone antenna for 30-80 MHz (in English)
 L. Ladell and others March 1981

Comparative antenna measurements were made with Hallén, longwire and disc-cone antennas (directional antenna At 237, directional antenna At 984 and high-elevation antenna 1), sited in a real environment, in this instance a section of woodland in broken country. Three different aerial sites and three frequencies, 33, 55 and 75 MHz, were used.

The results are evident from the comparative aerial diagrams in the report. Among other things they show that the environment affects radiation patterns only to a limited extent at the lowest frequency, whereas the effect is strong and sometimes devastating at the highest frequency. The effects of aerial rigging on a slope are also clearly illustrated.

- (205) FOA Report C 30214-E2
 Investigation of wave propagation in the sporadic E-layer
 Mats Bröms May 1981

This report presents the results of measurements of transmission via the sporadic E-layer over the path Kiruna - Stockholm. These results are compared with measurements made with the vertical ionospheric probe at Lycksele, which lies about 100 km from the middle of the path.

It was found that sporadic E makes a significant contribution to transmission. In summer maximum transmission frequencies higher than those of the normal E-layer were obtained on average for between 40% and 70% of the hourly routine measurements, while in autumn, winter and spring the values lay between 20% and 50%. Maximum observed transmission frequencies (EsMOF) are presented in the form of median curves for each month during the measuring period. For the greater part of the time the median frequency lies above about 10 MHz, and is limited upwards by the frequency range (about 14 MHz) of the measuring apparatus.

The distribution of EsMOF was also investigated for several different periods when the frequency range of the apparatus had been extended to a maximum frequency of 28 MHz. Some transmissions were found to occur at frequencies above 28 MHz. This happens in 2-3% of cases, in summer spread throughout the day, and for the rest of the

year only at night. In this connection a comparison was also made with forecasts of Es propagation. It was found that they greatly overestimate the possibility of transmission, especially at low frequencies. The correlation between EsMOF and the maximum usable frequency (EsMUF) as calculated from vertical measurements at Lycksele was also investigated for several periods. The correlation coefficient so obtained lies at about 0.5 and slightly above.

- (206) FOA Report C 30222-E2
Comparative antenna measurement in real environment: 30-80 MHz antennas in wooded areas (in English)
Folke Land and others June 1981

Comparative aerial measurements were made with manpack, normal, Scoobydoo, longwire, Hallén, disc-cone and vehicle aeriels for the range 30-80 MHz. A selection of the abovementioned aeriels were sited in a real environment consisting of flat woodland, at seven different places about 20 km south of Växjö. At five of these places five aeriels were sited, and at the other two places two and three aeriels respectively. Measurements were made at 38 and 66 MHz. However at the site with only two aeriels, measurements were made on 42 MHz alone.

The report contains the measuring results and the circumstances surrounding the actual measurement. On the other hand an analysis of the results and their consequences for the choice of aerial are absent. The analysis will be reported in another form.

E3 Guidance, navigation and target identification

- (207) FOA Report A 30026-E3 (in English)
Notes on underwater acoustic navigation April 1981
Lars Gøtherström

The report contains a description of the micro- and macro-structure of the hydroacoustic information channel. Underwater navigation in terms of detection and estimation is discussed against this background. The variance and mean values of estimates of distance and bearing are considered, together with decision-making errors and ambiguity.

E4 Countermeasures, including signal interception and technical intelligence

- (208) FOA Report A 30025-E4
A digital simulator for radar signal environments March 1981
Bo Karlsson

For the simulation of radar signal environments at the HF and video frequency levels, digitally-controlled analogue signal generators are mostly used. The same analogue generators can be used for simulation at the digital level by a/d conversion of their outputs. In theory this represents a roundabout way, at least for the case where only the digital output signal is wanted.

The present report describes an experiment in simulation at the digital level by means of a multi-processor technique without using analogue signal generators.

H HUMAN ENVIRONMENTH1 Investigations, future projections

- (209) FOA Report C 55048-H1
 Psychiatric practice for enlistment - generation of a theoretical model of the psychological and psychiatric decision-making process of exemption
 Gerry Larsson and Bengt Starrin March 1981

The object of this study is to examine the psychological and psychiatric decision-making process which ultimately leads to exemption in the proceedings for military enlistment. A further object is to generate a theoretical model from data in order to understand and explain the aspects being studied. Data have been gathered by interviews with ten enlistment psychologists and ten enlistment psychiatrists. A comprehensive account is given of responses at these interviews. The theoretical proposal contained in the report means that the psychological and psychiatric decision-making process can be understood and explained in the context both of organisational and inter-personal factors. The ethical, scientific, political and existential implications of the results are discussed.

H2 Hostile environments, closed units, field hygiene

- (210) FOA Report C 20414-H2
 Study of the permeability of polymer materials to organic compounds
 Allan Linnarson and Kjell Halvarson June 1981

This investigation is a continuation of an article reported earlier. Polymer membranes were tested on a selection of organic substances covering solvents, curing agents and epoxy resins. The membranes were tested with the substances in both the pure and the mixed form. The experiments were conducted with test apparatus designed for connection to a mass spectrometer.

Polymer membranes are not homogeneous, but contain microscopic cracks and pores which contribute to the scatter in the test results. The experiments further showed that the total pressure gradient over the membranes does not affect determination of the time lag.

The experiments confirmed results previously found, that penetration is affected by the composition of a mixture. A membrane may be resistant to one component, whereas it can penetrate rapidly when in a mixture. The penetration time for components of a mixture is plotted against the time for the fastest penetrating component.

The project was executed with contributions from the Industrial Safety Fund.
 Contract Dnr 75/65:2, 75/65 T.

- (211) FOA Report C 54032-H2, H3
 Effect of pulsed microwaves on respiration and body weight in mice
 C.O. Criborn and others April 1981

Relatively few investigations have been conducted into the effect on respiration during irradiation with microwaves. It has been found that mice are able to compensate for the incoming energy in the form of microwaves by reducing their respiration and oxygen consumption under continuous, non-pulsed, radiation (Criborn and Clemedson 1980). By means of a specially designed microwave generator for pulsed waves it was possible to irradiate mice with pulses which were synchronised with different phases of the

respiration. By also pulsing the waves at higher and lower rates than the respiration rate normal for such animals we have shown that certain effects of microwaves are evident with shorter periods of irradiation. The effects concerned the frequencies and volumes per minute of respiration. Although no heating of the animals' bodies occurred at the low mean power of about 1 mW/cm² during irradiation, it was possible to measure certain effects on body weight. This may indicate that the thermal energy balance may have been affected in some way.

H5 Emergency treatment, rehabilitation, preventive medicine

(212) Studies in emergency treatment. (Children under wartime and emergency conditions Kamedo)

It can generally be said that a nation's standard of development can be measured by the care devoted to its children. Similarly it could perhaps be claimed that the standard of development in a country's defence planning can be measured by the solicitude and precision in the plans for taking care of children in wartime or emergency situations.

In Sweden there are about 1.5M children under 15 years, of which about 700000 under 7 years of age, who form a particularly vulnerable group needing the continuous care of adults. It can be assumed that this need will increase during wartime, emergency or disaster, when removal, evacuation, separation from parents and friends and also perhaps direct military action may all seriously jeopardise children's security.

This report, which is addressed to all those responsible for children's situations in wartime or widespread mishaps, whether in an administrative or practical capacity, discusses briefly the child's experiences, behaviour and mental problems in connection with such situations. The presentation, which is largely based on foreign experience, is confined to what may be regarded as both current and likely within our sphere of culture. However, continuous technical development, cultural change and social restructuring are all in progress. War itself is changing its nature in many respects, and may cover situations from a coup, terrorism, a limited conventional war to a total war, in which the adversary may also possibly use ABC weapons which will then afflict the civilian population to the same serious extent as the combatant units. Hence experience can never be completely translated into future conditions in Sweden.

H9 Man and machine systems

(213) FOA Report C 53004-H9
 Similarity of distorted pictures: on the interaction between edge blur and
 random noise (in English)
 Lena Linde April 1981

The similarity between distorted static images was studied. The distorting stimulus variables of random noise and edge blur were varied according to a factorial design. Four different black-and-white scenes were presented. These scenes consisted of non-figurative patterns of rectangles having two different spatial frequency distributions and two realistic photographic images. The non-figurative scenes were presented with three different values of the stimulus variables, and the two realistic scenes with four different values of their respective stimulus variables. The observers assessed the similarity among all of the possible 9 and 16 images respectively of each scene.

Similarity data revealed the existence of an interaction among the physical variables. Increased edge blur produced a subjective increase in the noise ratio, and increased noise tended to produce a subjective reduction of the interval between different degrees of edge blur. The first-named interaction was represented by spatially high-frequency scenes, while the latter interaction was represented by spatially low-frequency scenes. The spatially high-frequency scenes were characterised by a rapidly varying texture and many edges, and the low-frequency scenes by a slowly varying texture, large homogeneous surfaces and few details. A multi-dimensional scaling analysis with *MDSAL* also demonstrated the presence of dissimilarities with respect to the subjective space between spatially high- and low-frequency scenes respectively.

M INTERDISCIPLINARY STUDIES AND INVESTIGATIONS

M3 Security aspects of environmental studies

(214) FOA Report B 10033-M3

Future studies and national security: the Swedish experience (in English)
Nils Andrén

The article deals with Swedish defence-oriented research concerning the future development of the international system. The research forms part of a long-term planning system involving three important groups of participants: politicians, administrators or civil servants, and scientists. The general guidelines are laid down by the Department of Defence (or ultimately by the Government and Parliament). The points of departure for planning the research were to a large extent formulated in accordance with the experience and traditions of the defence authorities. The research was conducted by, or in close conjunction with, the Institute of Defence Research (FOA). The results of the research produced in connection with defence planning included both general long-term projections, expressed as 'alternative futures', and special defence scenarios. The scenarios play an important role, among other things, when assessing the characteristics of alternative defence patterns, in the event of possible future threats to Sweden. As a scientific activity, the future studies are also characterised by the fact that they are conducted in an environment marked not only by more or less well-defined political objectives and attitudes, but also by administrative necessity and institutional preferences.

Offprint from *Cooperation and Conflict* (1981), 16, pp 39-56.

FOA Reprints 1980/81:32.

(215) FOA Report C 10178-M3

Background to Polish security policy
Mieczyslaw Lidert

March 1981

The subject of Poland as a destabilising factor in the Soviet Bloc and as potential threat to the established balance of power between East and West is occurring with increasing frequency in the geopolitical debate. The purpose of the present article is to discuss the factors which are believed to affect the specific role of Poland in international politics.

The bulk of this study is therefore devoted to a sketch of the historical background to the pattern of interactions in Polish-Soviet relations, and to the problem of

legitimacy among the Polish national power elite. These variables are assumed to be those which mainly determine the formation of Polish security policy.

The trends in Polish internal policies and in Polish-Soviet relations on the threshold of the 1980s indicate a continuation of de-Sovietisation and a re-Polonisation of the country's political life with stronger leanings towards the West. When set in the context of Poland's occupation of a key position in the security system of the USSR, this process is likely to lead to an erosion of the Soviet pattern of dominance in Eastern Europe.

Any possible attempt to counteract this process by military force might not result in some form of 'normalisation' as with Czechoslovakia, though it might involve some serious consequences whose nature is difficult to predict for East-West relations.

This study forms part of the 'Eastern Project'.

(216) FOA Report C 10179-M3
Weapons for the Third World. The international arms trade in the context of security policy
Bo K.A. Hultdt
March 1981

In the process of decolonisation many new international actors have made an entry on to the international stage since World War II. The membership of the UN has tripled since 1945.

Subsequently and to varying extents the new states have acquired military resources; practically all the wars waged since 1945 have involved precisely these former colonial regions. At present about 75% of all weapons exports go to the Third World.

The report on "Weapons to the Third World" has the following objects:
"to provide an overall picture of arms transfers to the Third World which have mainly taken place since the early 1970s;
to assess the domestic capacity (including under licence) for arms manufacture in the Third World;
to comment on the attempts made to monitor and limit the international arms trade; and finally
to analyse the consequences for security policy of trade and armaments in relations among the LDCs mutually, and between them and the industrial countries."

The report poses the question whether arms exports to the Third World and current armament within the Third World are in general destabilising and conducive to war, or whether any stabilising and peace-promoting factors can be identified. It is the author's opinion that no such answer of general validity exists. The general finding however is that developments during the 70s point to a dangerous international environment during the 80s, with high risks of war. Nevertheless these risks are not primarily due to the arms trade, but are governed by political and other conflicts in the Third World.

(217) FOA Report C 10181-M3
The foreign and security policies of Romania
Irene Nilsson
February 1981

This study of foreign and security policies in Romania consists of four parts. The first section deals with the origin of the reorientation of Romanian foreign policy during the 1960s. The introductory section discusses the Romanian economic policy which

led to a confrontation with the Soviet Union and other East European states. The following section seeks to answer the question of how a confrontation over the national development strategy of a country could form the point of departure for the future orientation of that country's foreign policy. One answer must be that Romania legitimised its choice of economic policy by deriving from the official Communist ideology a set of principles which have since come to be the guide for Romania's future relations with other states. This section therefore deals with Romanian ideology. The second section is meant to provide a brief account of Romanian foreign policy from the beginning of the 1960s until the end of the 1970s. During this period the country's foreign policy has changed, and for this reason the period is divided into three phases: 1958-63/64; 1965-69 and 1970-71 onwards. The third section considers the means and the strategies of which Romania has availed herself in order to fulfil her foreign policy. This defence network includes a number of different components, and each section under this section deals with one such component. The fourth section raises the question of how the foreign policy of Romania will be developed during the 1980s. Three courses are discussed. The two 'poles' are a return to the militant and independent attitude which was characteristic of Romanian foreign policy during the second half of the 60s, and a total adherence to the foreign policy line of the Warsaw Pact states. The third line of action, a midway alternative, is a continuation of the policy of the 70s, which is characterised by a greater readiness to cooperate with the East Bloc than during the second half of the 60s, though with some evidence of an independent attitude.

This study forms part of the 'East Project'.

M5 Economic studies

(218) FOA Report C 10182-M5

Innovation in industry and some considerations of support measures
Rutger Engellau

May 1981

This study illustrates how ideas on new technology, new products and processes are adopted in industry. The object is to facilitate the search for cheap but perhaps effective measures of support in order to promote innovation. These measures will principally favour small and medium businesses, and could be adopted regionally, within counties and local districts.

Of the various decisions which could be taken, the author would mention the following points in particular:

"find the right forum for new ideas on new technology and new products. The fact that one or more businesses have opted not to invest in some idea does not necessarily mean that it is expected to be unprofitable;

many businesses seek their own niches or fields of products in which to operate. It may often be better to support the formation of new businesses for ideas which lie outside the field of activity of existing businesses;

encourage collaboration among businesses. Collaboration may open fresh opportunities for small entrepreneurs to develop and launch their ideas;

channel the available support to energetic and industrious people. Where enthusiasm and responsibility are lacking, no success will result."

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- (219) BN Report No.107
Confidence in politicians
Torsten Österman (FSI)

May 1981

This investigation is based on opinion polls conducted between 1973-1980. It was found that the public's confidence in Swedish politicians waned steadily during the 1970s. Some possible reasons are discussed.

- (220) BN Report No.108
Attitudes to society, the outside world and defence
Kurt Törnqvist

June 1981

This opinion poll was conducted during the spring. Among other things it demonstrates that the population's attitude to society is unchanged since last autumn, but anxieties about political tension and awareness of the risk of war have increased. Meanwhile confidence in the capability and determination for defence has grown. A larger proportion would wish to strengthen the defences and increase their cost.

- (221) BN Note No.90
Effects of campaigns in the mass media (Public Opinion Quarterly)
Michael A. Milburn
Translated by Kurt Törnqvist and Ingemar Staaf January 1981

In the study reported in this report the effect of a campaign in the mass media on health questions was investigated in order to test the hypothesis of selective exposure. The results indicate support for the effectiveness of campaigns in the media, while offering little support to the hypothesis of selective exposure.

- (222) BN Note No.91
Trustworthiness of mass media (Journalism Quarterly)
Ronald Mulder May 1981
Translated by Kurt Törnqvist and Jan Skoglund

The valuable aspect of Mulder's study is an investigation of the connection between the use of, and satisfaction with, the media. Thus he can show that people who are actively looking for news consider the newspapers to be the most reliable news media, to a greater extent than those who only passively look for news.

SWEDISH DEFENCE RESEARCH ABSTRACTS

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